

SUPPORT FOR THE AMENDMENTS

Claims 1-5, 12, and 13 have been amended.

The amendment to Claim 1 is supported by original and previously pending Claim 1, the specification at pages 2-35, see for example page 5 last line to page 8, line 9. The amendment to Claim 13 serves to correct the notation of Ar<sup>1</sup> and Ar<sup>2</sup>. Claims 1-5, 12, and 13 has been amended to remove “the general” from the expression “the general formula (1)”.

The amendment to Table 1 on page 42 to correct the typographical error resulting in an indicated current efficiency of “1.3” with the proper current efficiency of “10.8” for Example 2 is supported Table 1 of the priority application PCT/JP2004/018964.

No new matter is believed to have been entered by the present amendments.

REMARKS

Claims 1-14 are pending in the present application.

At the outset, Applicants wish to thank Examiner Brooks and Examiner Sullivan for the helpful and courteous discussion with their undersigned Representative on October 27, 2010. During this discussion, various amendments and arguments were presented, which are reflected in the amendments and remarks herein. Applicants request reconsideration of the outstanding rejections.

The rejection of Claims 1-5 and 12-13 under 35 U.S.C. §102(b) over EP 1009044 (EP ‘044) is obviated in-part by amendment and respectfully traversed in-part.

In making this ground of rejection, the Examiner cites compounds 41, 42, and 43, as well as the subgenus appearing on page 37, as allegedly anticipating the claimed invention. Applicants submit that for the reasons that follow this allegation is without merit and should be withdrawn, but have nonetheless amended the claims to further distinguish the claimed invention from the disclosure of EP ‘044.

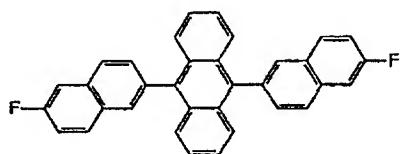
First, with respect to Claims 12-13, Applicants submit that this ground of rejection has no merit. Specifically, in each compound and the subgenus recited in EP ‘044 the positions corresponding to A<sup>1</sup> and A<sup>2</sup> in the asymmetric anthracene derivative represented by formula (1) or formula (1') is a 2-naphthyl group. Claim 12 requires that the asymmetric anthracene derivative represented by formula (1') has:

wherein, A<sup>1</sup> and A<sup>2</sup> each independently represents a substituted or unsubstituted condensed aromatic hydrocarbon ring group selected from 2-naphthyl group, 1-phenanthryl group, 2-phenanthryl group, 3-phenanthryl group, 4-phenanthryl group, 9-phenanthryl group, 1-naphthacenyl group, 2-naphthacenyl group, 9-naphthacenyl group, 1-pyrenyl group, 2-pyrenyl group, 4-pyrenyl group, 3-methyl-2-naphthyl group and 4-methyl-1-naphthyl group, and

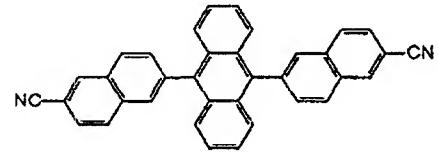
at least one of A<sup>1</sup> and A<sup>2</sup> represents a substituted or unsubstituted condensed aromatic hydrocarbon ring group selected from 1-phenanthryl group, 2-phenanthryl group, 3-phenanthryl group, 4-phenanthryl group, 9-phenanthryl group, 1-naphthacenyl group, 2-naphthacenyl group, 9-naphthacenyl group, 1-pyrenyl group, 2-pyrenyl group, and 4-pyrenyl group;

Since compounds 41, 42, and 43, as well as the subgenus appearing on page 37, of EP '044 do not have "at least one of A<sup>1</sup> and A<sup>2</sup> represents a substituted or unsubstituted condensed aromatic hydrocarbon ring group selected from 1-phenanthryl group, 2-phenanthryl group, 3-phenanthryl group, 4-phenanthryl group, 9-phenanthryl group, 1-naphthacenyl group, 2-naphthacenyl group, 9-naphthacenyl group, 1-pyrenyl group, 2-pyrenyl group, and 4-pyrenyl group" EP '044 cannot anticipate Claims 12 and 13.

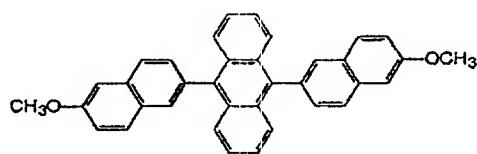
With respect to Claims 1-5, Applicants submit that compounds 41, 42 and 43 are the result of errors in the preparation of the EP specification from the priority application US 09/208,172 (filed December 9, 1998). Evidence of the correct structure for compounds 41, 42, and 43 is provided by the copy of the certified priority application **submitted herewith**, which was filed in the EP application on November 25, 1999, at pages 23-24. As shown on pages 23-24 of the priority application US 09/208,172, compounds 41-43 should have the following structures:



Compound 41

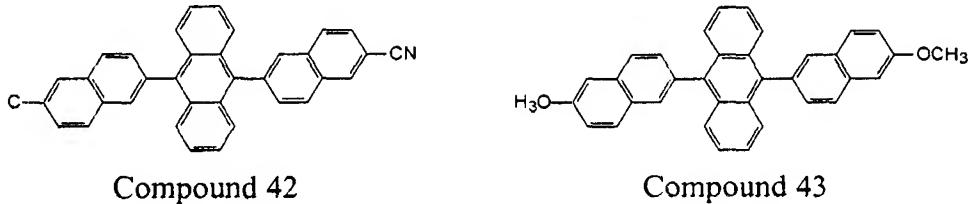


Compound 42



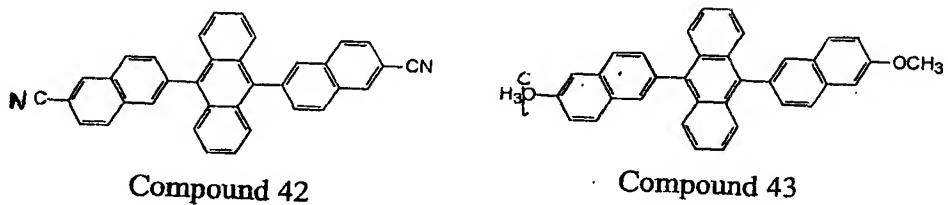
Compound 43

Further evidence of the errors come from facial consideration of the structures published in EP '044 for compounds 42 and 43, which violate the basic rules of chemistry. As published, compounds 42 and 43 of EP '044 appear as follows:



Clearly, the valence of carbon in compound 42 is unsatisfied and the a "H<sub>3</sub>O<sup>-</sup>" group is not possible.

The patentee of EP '044 acknowledged the errors in compounds 41, 42, and 43 on page 2 of the response filed on December 15, 2008 (dated December 11, 2008), a copy of which is **submitted herewith**. Also with the response filed December 15, 2008, the patentee of EP '044 filed an amendment to the specification to correct the structures compounds 42 and 43. In compound 42, left side "C-" is amended to "NC-", whereby the compound 42 becomes symmetrical. In compound 43, left side "H<sub>3</sub>O<sup>-</sup>" is amended to "CH<sub>3</sub> O<sup>-</sup>", whereby the compound 43 becomes symmetrical. The amendments to page 23 of the original European specification filed on December 15, 2008, a copy **submitted herewith**, are as follows:



In the response filed on December 15, 2008, the patentee of EP '044 states with respect to compounds 41, 42, and 43:

Finally the structure of compound 12 has been corrected as it is clear to any chemist that this cannot be an 'F<sub>3</sub>' group but should be '-CF<sub>3</sub>' in line with the other three -CF<sub>3</sub> groups. Compound 42 cannot have a '-C' atom and is clearly intended to be -CN as on the other side of the molecule. Substitution on Compound 43 on both pages 23 and 31 cannot be '-O<sub>3</sub>H' but is unequivocally -OCH<sub>3</sub> as this compound is named as 9,10-di-[2-(6-methoxy-naphthyl)] anthracene on page 40, line 11. Analogously compound 7 on page 14 clearly should have a -OCH<sub>3</sub> group on the 'left-hand' side of the molecule and not the chemically incorrect -OH<sub>3</sub> group.

In fact compounds 13 and 41 were fairly obviously intended to have a '-F' substitution on the 'left-hand' ring. However these corrections have not been made at this time as there is an argument that these structures are chemically possible as the bond could represent a methyl group. However, even though it is understood that one cannot use the priority document on which to base a correction, if the Examiner recognises the clear symmetry of the many compounds specified and the obvious intent, coupled with the many obvious printing errors on the 'left-hand' side of molecules, it would be appreciated if consideration could be given to correcting these two structures as well.

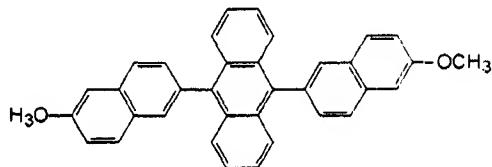
The publication of compounds 42 and 43 in EP '044 was also an error by the EPO as the specification was amended during examination. Further, as described above, in compound 41, the left side “-” is an error in writing, and it should be "F-“ as shown in US 2002/0028346 A1 and US 6,465,115B2. It is clear that compounds 41, 42, and 43 were never intended by the patentee, were never produced by the patentee, and only appeared as a result of error.

Thus, compounds 41, 42 and 43 have a structure in which 2-naphthyl group is symmetrically connected to 9- and 10-positions in anthracene ring. Compounds 26-30 and 36-40 (10 compounds) also have such the structure. Also, in the 10 compounds, the same 2-naphthyl group are symmetrically connected to 9- and 10-positions in anthracene ring. And as described above, the compounds 42 and 43 were amended to be symmetrical.

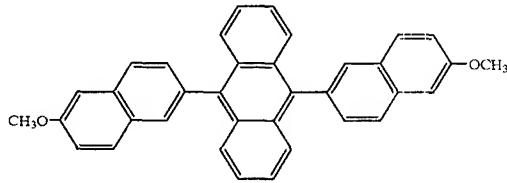
The skilled artisan would be aware of the error of the compound 41 in EP '044 based on the US 2002/0028346 A1 and/or US 6,465,115B2, and he or she is aware that substituted groups at 9- and 10-positions in anthracene ring are identical to each other regardless of

substituted groups (-F, -CN, and -OCH<sub>3</sub> in the compounds 41-43) connected to 2-naphthyl group.

It is further noted that the Examples in EP '044 only disclose compounds in which substituted groups (corresponding to 2-naphthyl group in the compounds 42-43) at 9- and 10-positions in anthracene ring are identical to each other, thus compounds 42 and 43 do not anticipate the claimed invention. In fact, EP '044 clearly discloses in Example 9 that compound 43 is not



but rather is



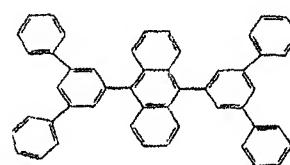
Further, the left side “-” in the compound 41 should be looked upon as an error in writing, and the compound 41 does not anticipate the claimed invention either.

Nonetheless, to expedite examination of this application only, Applicants have amended Claim 1 to specifically exclude an alkyl substituted 2-naphthyl group. Since the interpretation of the left side “-” of the erroneously published compound 41 would presumably be interpreted as a methyl group, the amendment here distinguishes over even the improper interpretation of compound 41 of EP '044. Thus, compound 41 cannot anticipate the claims even if the improperly published version is accepted.

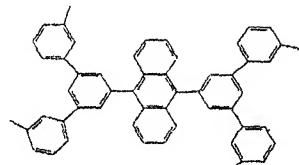
With respect to the sub-genus cited by the Examiner, Applicants submit that this disclosure is insufficient to support an anticipation rejection. Specifically, EP '044 fails to

disclose or suggest any species that falls within the scope of the claims, much less any 9,10-asymmetric anthracene compounds (i.e., a compound having different substituents at 9- and 10-positions). In fact, in the Examples of EP '044, the only compounds that are provided are 9,10-symmetric anthracene compounds (i.e., a compound having the same substituents at 9- and 10-positions). Indeed, all the compounds are a compound having the same substituent groups at 9- and 10-positions of anthracene skeleton or at 4-and 4'-positions of biphenylene skeleton. Specifically, the exemplified compounds in EP '044 are:

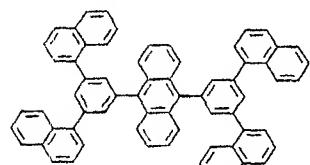
Example 2  
(Synthesis Example)



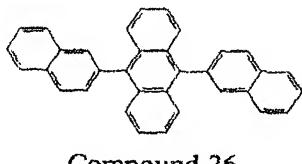
Example 4  
(Synthesis Example)



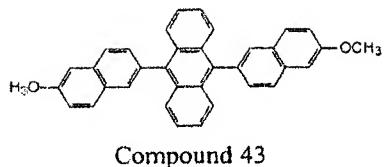
Example 6  
(Synthesis Example)



Example 8  
(Synthesis Example)

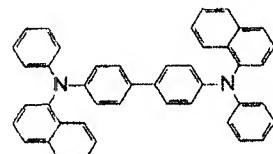


Example 9  
(Synthesis Example)



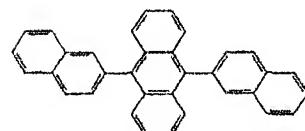
Compound 43

Example 10  
(EL test Example)



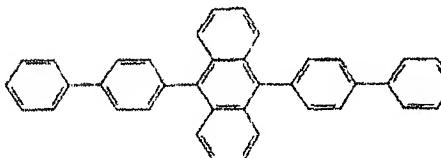
Compound 3

Example 11  
(EL test Example)



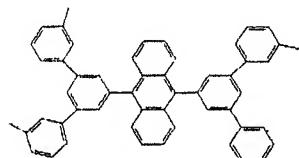
Compound 26

Example 12  
(EL test Example)



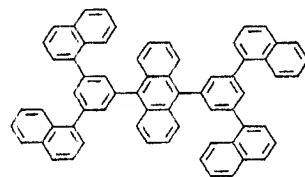
Compound 9

Example 13  
(EL test Example)



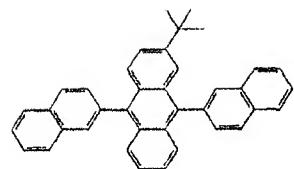
Compound 20

Example 14  
(EL test Example)



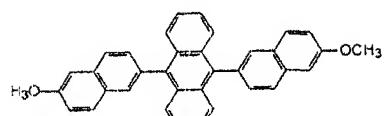
Compound 21

Example 15  
(EL test Example)



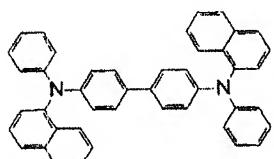
Compound 39

Example 16  
(EL test Example)



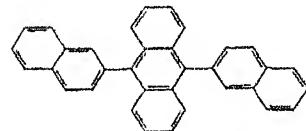
Compound 43

Example 17  
(EL test Example)



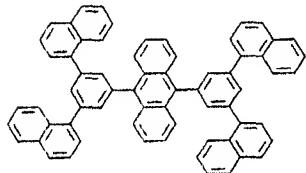
Compound 3

Example 18  
(EL test Example)



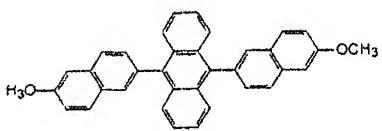
Compound 26

Example 19  
(EL test Example)



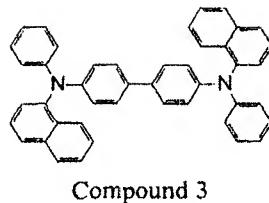
Compound 21

Example 20  
(EL test Example)



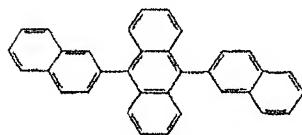
Compound 43

Example 21  
(EL test Example)



Compound 3

Example 22  
(EL test Example)



Compound 26

When the compound is not specifically named, but instead it is necessary to select portions of teachings within a reference and combine them, e.g., select various substituents from a list of alternatives given for placement at specific sites on a generic chemical formula to arrive at a specific composition, anticipation can only be found if the classes of substituents are sufficiently limited or well delineated. *Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990). EP '044 does not disclose a preparation process of the 9,10-asymmetric anthracene derivatives, and the EP '044 does not disclose how to prepare the compounds 41, 42, and 43 having the incorrectly published structures, or any other 9,10-asymmetric anthracene compounds. Accordingly, the skilled artisan in possession of EP '044 would not be led to an 9,10-asymmetric anthracene compound based on the disclosure of EP '044. As such, EP '044 cannot anticipate the claimed invention.

Withdrawal of this ground of rejection is requested.

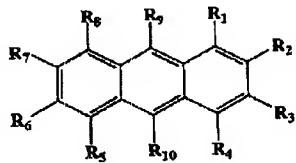
The rejections of (A) Claims 1-6 and 12-14 under 35 U.S.C. §103(a) over JP 11323323 (JP '323) and (B) Claims 1-6 and 12-14 under 35 U.S.C. §103(a) over JP 11323323 in view of US 2003/008524 (US '524) is respectfully traversed. For sake of expedient examination, Applicants submit that the arguments that follow also apply to any possible position of obviousness with respect to EP '044.

In the Office Action, the Examiner cites the generic formula defined in Claim 1 of JP '323, which provides:

[Claim 1]A luminescent material characterized by what is shown in a following general formula (1) which makes an anthracene ring a basic skeleton.

[Chemical formula 1]

—~~式~~(1)



(R<sub>1</sub> - R<sub>8</sub> show a hydrogen atom, an alkyl group, and an alkoxy group among a formula.) R<sub>9</sub> and R<sub>10</sub> express a naphthyl group which may have a substituent chosen from an alkyl group and an alkoxy group, an anthryl group, a phenan tolyl group, a biphenyl group, and a terphenyl group.

The Examiner recognizes that all of the examples of JP '323 have substituents at the 9<sup>th</sup> and 10<sup>th</sup> position of the anthracene core have the same substituent. But, despite disclosing any examples or a specific recitation to allow the artisan to clearly envisage a 9,10-asymmetric anthracene derivative, the Examiner alleges that making a compound within the scope of claimed invention would have been *prima facie* obvious based solely on the disclosure of JP '323 or when taken with US '524.

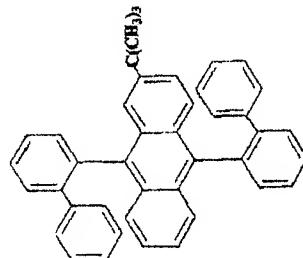
During the discussion with the Examiner on October 27, 2010, the Examiner indicated that upon consideration if the arguments and amendments above with respect to EP '044 were sufficient to overcome the anticipation rejection, the sub-genus disclosed at page 37 of EP '044 may be used in support of an obviousness rejection following logic similar to that above

for JP '323. Applicants submit that the claimed invention is not obvious in view of either JP '323 or EP '044 with or without US '524 for the reasons that follow.

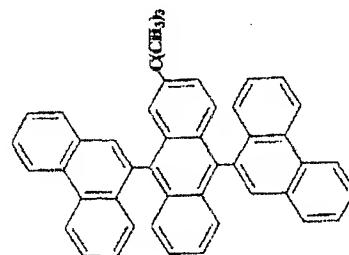
None of these references provide any examples of a 9,10-asymmetric anthracene compound within the scope of the claimed invention, nor do these references disclose a method of making a 9,10-asymmetric anthracene compounds. Accordingly, absent Applicants' disclosure the artisans would not have any reasonable basis to make the modifications of the compounds disclosed in these reference to arrive at a 9,10-asymmetric anthracene compound within the scope of the claimed invention. Further, a 9,10-asymmetric anthracene compound as claimed is not "structurally similar" to a 9,10-symmetric anthracene compound such that a reasonable basis exists to conclude similar properties would exist between these "similar" compounds.

The exemplified compounds of EP '044 are cited above, while the exemplified compounds of JP '323 are as follows:

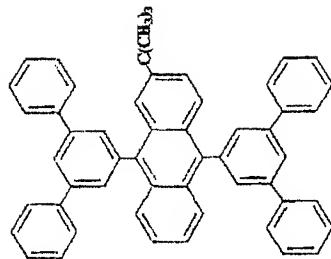
Example 1



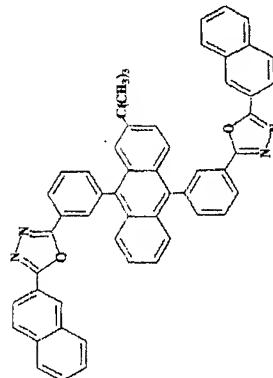
Example 2



Example 3



Example 4



As was the case with EP '044, neither JP '323 nor US '524 disclose or suggest a preparation process for 9,10-asymmetric anthracene derivatives. This is an important deficiency in the disclosures of EP '044, JP '323, and US '524 as the process for producing 9,10-asymmetric and 9,10-symmetric anthracene derivatives are quite different.

Compared with the preparation of 9,10-symmetric anthracene derivatives, the preparation of 9,10-asymmetric anthracene derivatives accompanies by difficulty from viewpoint of preparation technologies. For example, a preparation process of 9,10-asymmetric anthracene derivatives includes an increased number of reaction stages, because 9,10-asymmetric anthracene derivative has to be separated from a mixture of 9,10-symmetric anthracene derivative with 9,10-asymmetric anthracene derivative, requiring an additional reaction stage. The complexities of these processes can be understood by reference to the present specification and US 2007/0108892, while Journal of Organic Chemistry, 2008, 73,

4326-4329 (copy submitted herewith) illustrates a preparation process for 9,10-symmetric compounds (anthracene derivatives).

Thus, contrary to the allegations by the Examiner, it would not have been obvious to simply modify the exemplary compounds of JP '323 (or EP '044), even when looking at US '524, to arrive at a 9,10-asymmetric anthracene derivative as claimed. Specifically, the skilled artisan would not have been motivated to produce 9,10-asymmetric anthracene derivatives, because the preparation processes known at the time the present invention was made were directed to the production of 9,10- symmetric compounds and this is all that is provided in the cited art.

Applicants again submit that even if a *prima facie* case were made, “[a] *prima facie* case of obviousness . . . is rebuttable by proof that the claimed compounds possess unexpectedly advantageous or superior properties.” See MPEP §2144.09 (citing *In re Paesch*, 315 F.2d 381 (C.C.P.A. 1963)). Rebuttal evidence may consist of a showing that the claimed compound possesses unexpected properties. *In re Dillon*, 919 F.2d 688, 692-3, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990). “Evidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a *prima facie* case of obviousness.” No set number of examples of superiority is required. *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987)”

With the foregoing in mind, Applicants direct the Examiner’s attention to Table 1 on page 42 of the specification. For ease of reference, Applicants provide the following table based on Table 1 on page 42 of the specification, which has been modified to include the structures:

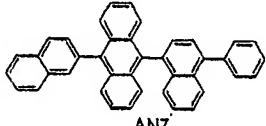
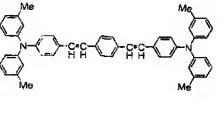
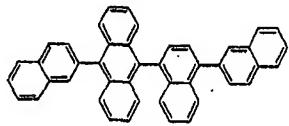
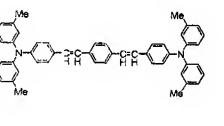
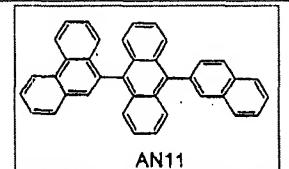
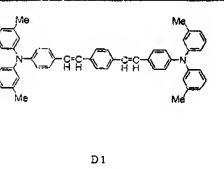
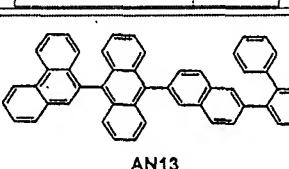
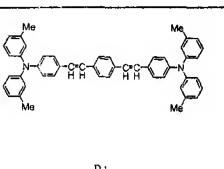
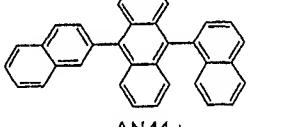
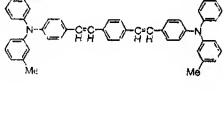
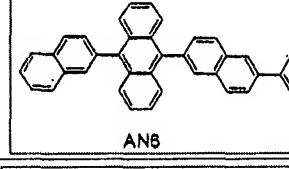
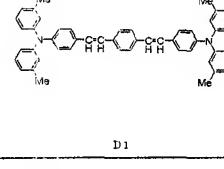
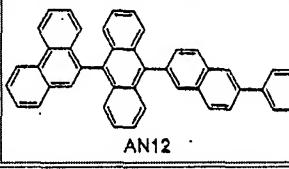
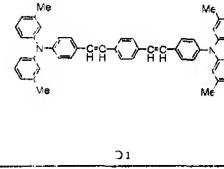
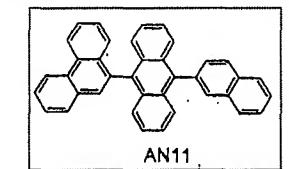
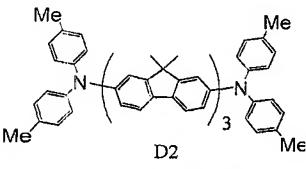
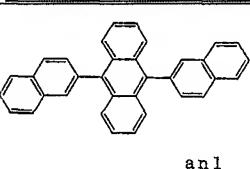
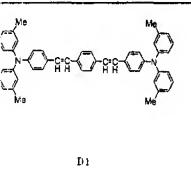
	Host compound No.	Dopant	Current efficiency (cd/A)	Half Lifetime (hours)
Example 1 [Production Example 1]			10.9	4,200
Example 2 [Production Example 2]			10.8	4,200
Example 3 [Production Example 3]			11.0	5,800
Example 4 [Production Example 4]			10.8	3,700
Example 5 [Production Example 5]			10.0	3,000
Example 6 [Production Example 6]			10.1	3,300
Example 7 [Production Example 7]			10.8	4,900
Example 8 [Production Example 3]			10.3	3,700
Comparative Example 1			9.0	2,200

Table 1 shows that Examples using 9,10-asymmetric anthracene derivative have a superior current efficiency and half lifetime as compared with Comparative Example 1 using 9,10-symmetric anthracene derivative (exemplary of the compounds of the cited art). With respect to the relevance of the evidence to the cited art, “an1” corresponds to the compound 26 in the EP ‘044, and it corresponds to “ADN” in US 2003/0068524. The compounds 41-43 are also similar to the “an1” which show poor current efficiency and half lifetime. Accordingly, Applicants submit that the claimed 9,10-asymmetric anthracene derivatives are unexpectedly superior to the 9,10-symmetric anthracene derivatives disclosed in the cited art.

Withdrawal of these grounds of rejection is requested. .

Applicants submit that the present application is now in condition for allowance. Early notification of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, L.L.P.  
Richard L. Treanor, Ph.D.



Vincent K. Shier, Ph.D.  
Registration No. 50,552

Customer Number  
**22850**  
(703) 413-3000  
Fax #: (703)413-2220